ECE 3050 Analog Electronics Quiz 1
August 26, 2009
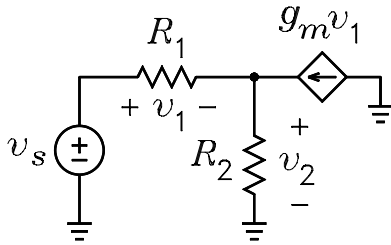
Professor Leach   Last Name:_____First Name:_____
Instructions. Print your name in the spaces above. Place a box around any answer. **Honor Code Statement:**
I have neither given nor received help on this quiz. Initials _____

1 of 2. For $v_s = 5\,\text{V}$, $R_1 = 11\,\text{k}\Omega$, $R_2 = 1.1\,\text{k}\Omega$, and $g_m = 1/20$:

(a) Use superposition, voltage division, current division, and Ohm's Law to solve for v_1.

(b) Use the values of v_s and v_1 to solve for v_2.

$$R_1 := 11000 \qquad R_2 := 1100 \qquad v_s := 5 \qquad g_m := \frac{1}{20}$$

$$v_1 = v_s \cdot \frac{R_1}{R_1 + R_2} - g_m \cdot v_1 \cdot R_{p2}(R_1, R_2)$$

$$v_1 := v_s \cdot \frac{\dfrac{R_1}{R_1 + R_2}}{1 + g_m \cdot R_{p2}(R_1, R_2)} \qquad\qquad v_1 = 0.089$$

$$v_2 := v_s - v_1 \qquad\qquad v_2 = 4.911$$

2 of 2. (a) With the aid of a graph, illustrate how the value of the diode small-signal resistance is defined. [It is the reciprocal of the slope of the i_D versus v_D graph.]

(b) Draw and label the hybrid-π model of the BJT.